product user guide

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all the support you need

Title	Issue	Date
5.1m Long by 3.2m High Clearance Dragbox	2	Aug. 2013

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1. Introduction

This booklet is intended to provide basic information for users of the Mabey Hire Limited 5.1m long x 3.2m High Clearance Dragbox system and to draw the clients attention to the practical aspects of handling, assembly, installation and use which need to be considered in compiling a safe system of work. In particular, the clients attention is drawn to the size and weights of the Dragbox components and the need for planning the lifting operations involved.

All major components of the Dragbox System have handling points for safe slinging.

It is assumed that clients are familiar with general safe practices applicable to the use of Dragboxes.

The Dragbox is intended to act as a shield to provide a safe working area for operatives working in a trench and is designed to be placed into a fully excavated section of the trench. It is not intended to provide significant support to the trench sides, and is therefore intended for use only in dry stable ground which stands to the excavated depth.

NOTE : Dragging of the box may be difficult if side loading exists due to friction on the panels. Any side loading must be removed before attempting to drag the box either by the front struts or the dragging points. Users should ensure that the length and selected width of the box is sufficient for the work to be carried out.

Dragboxes are not normally suitable for use in urban conditions, soils with a high water table or in trenches crossed by frequent services.

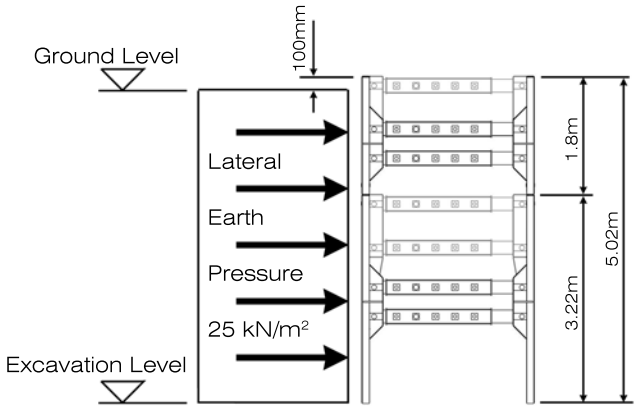
The Dragbox is not intended for other purposes.

2. Design

In the event of trench wall instability the Dragbox is designed to carry a uniform lateral earth pressure of 25kN/m^2. Users are advised to check that their excavation arrangements will not impose greater working pressures than this.

Conditions which will increase the likelihood of trench wall instability and lateral earth pressures are:-

- Close proximity of structures.
- Excavated or construction materials adjacent to the trench.
- Close proximity of site / public roads.
- Close proximity of railways.



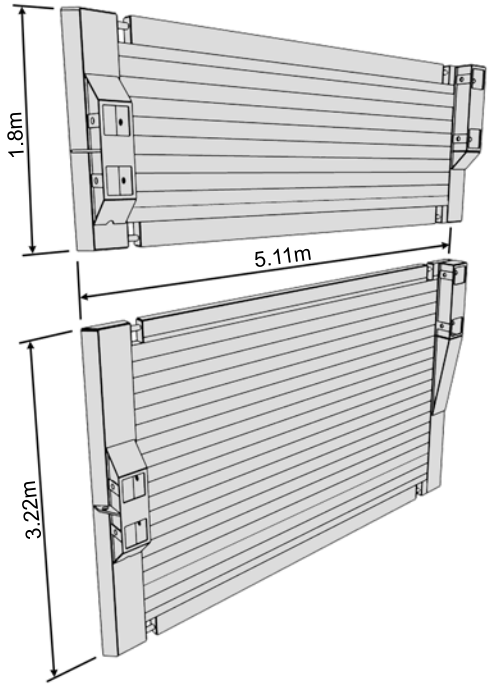
3. Transportation - Notice to Police

Important : As the load exceeds 3.0m in width, two days clear notice must be given to the police in every district through which the vehicle is to pass. If the actual carrier is different to the company organising the load movement and completing the paperwork, the carriers details must be included in the notification.

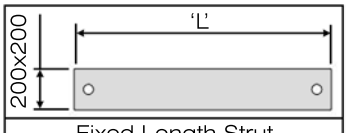
The police may vary the journey date, time or route. They also have the power to stop the vehicle in the interests of road safety or to avoid undue traffic congestion.

4. Identification of Components

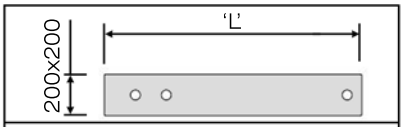
Extension Panel
Code (Left Hand) : DBX-TPNL5.1LH/HC
Code (Right Hand) : DBX-TPNL5.1RH/HC
Weight : 1100 kg



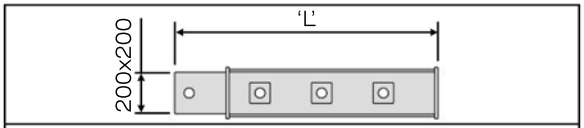
Base Panel
Code (Left Hand) : DBX-PNL5.1LH/HC
Code (Right Hand) : DBX-PNL5.1RH/HC
Weight : 1800 kg



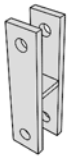
Fixed Length Strut		
Code	Length 'L' (mm)	Weight (kg)
DBX-S800/HC	800	55.5
DBX-S950/HC	950	63.0



Telescopic Strut Inner		
Code	Length L' (mm)	Weight (kg)
DBX-AINNER/HC	920	67.5
DBX-BINNER/HC	1220	88.0
DBX-CINNER/HC	1822	130.5
DBX-DINNER/HC	2720	194.5



Telescopic Strut Outer			
Code	Length 'L' (mm)	No. of Adjusting Holes	Weight (kg)
DBX-AOUTER/HC	950	2	89.5
DBX-BOUTER/HC	1255	3	117.0
DBX-COUTER/HC	1832	5	170.0
DBX-DOUTER/HC	2730	8	253.5

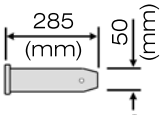


Extension to Base Connector

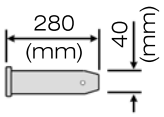
Code : DBX-CON/HC
Weight : 12 kg

Long 'D' - Piling Shackle
SWL : 3 tonnes
Code : DBX-SHACKLE/HC
Weight : 2.29 kg

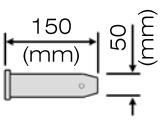
16mm Chain Sling
Code : DBX-SLING/HC
Weight : 147 kg
Refer to lifting chain user information for further details



Strut Inner to Outer Connector Pin
Code:DBX-SPIN/HC
Weight : 4.5kg

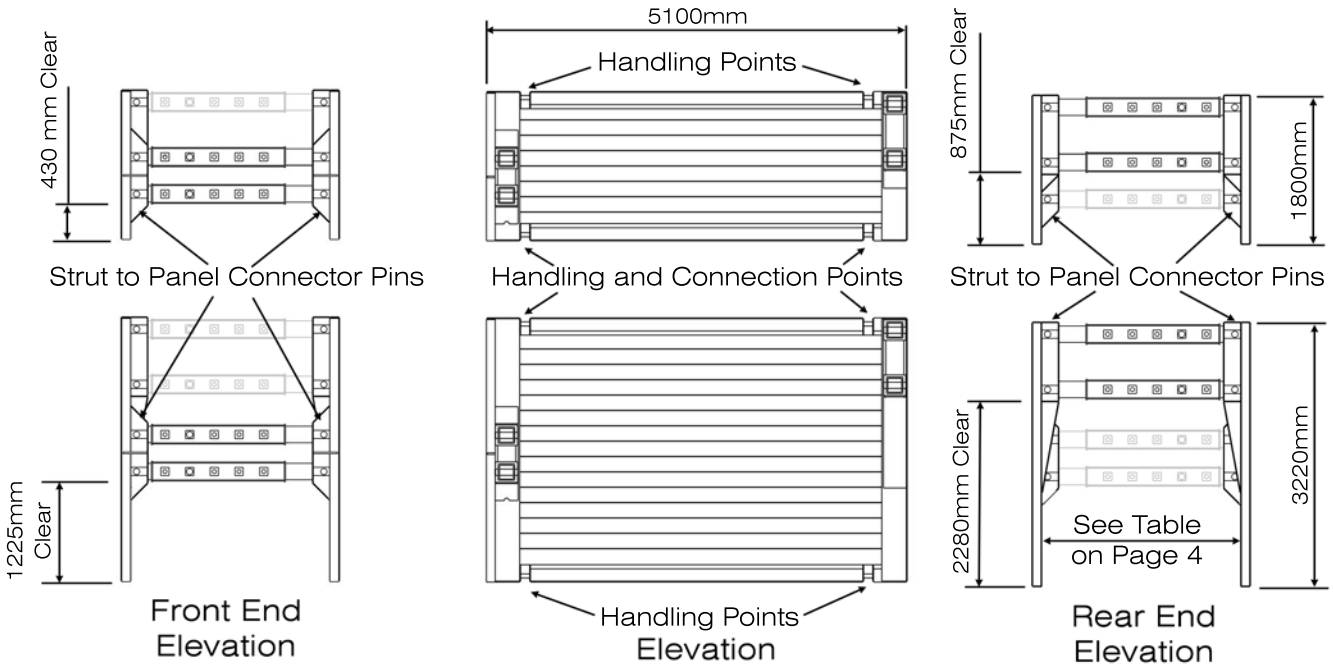


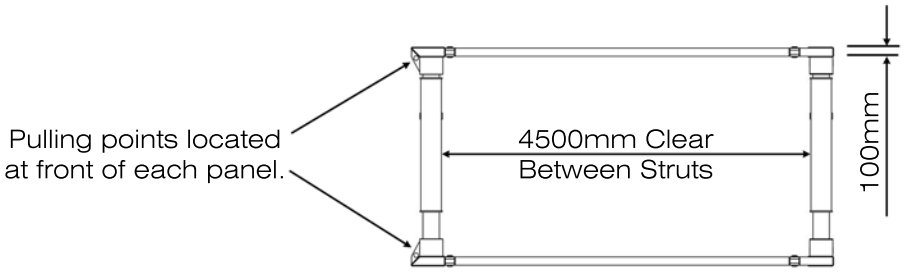
Strut to Panel Connector Pin
Code:DBX-CPIN/HC
Weight : 3kg



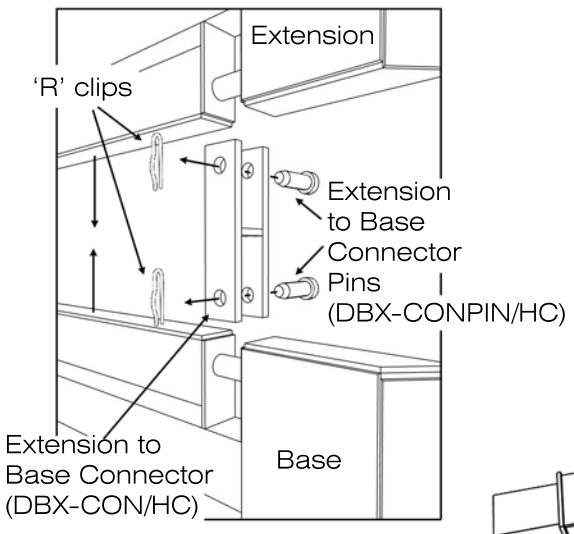
Extension to Base Connector Pin
Code:DBX-CONPIN/HC
Weight : 1.1kg

5. Dimensions and Connection Details

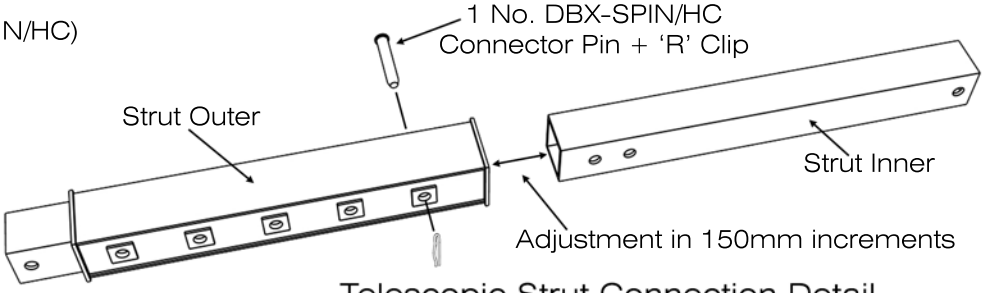




Plan



Extension to Base Connection Detail



Telescopic Strut Connection Detail

6. Dimensions and Weights

6.1. Always allow sufficient clearance for the excavator bucket to work comfortably within the internal width of the box when selecting the size required.

6.2. All telescopic struts are adjustable in 150mm increments.

Dimensions and Weights

	Internal Width (mm)		External Width (mm)		Base Box		Extension	
Strut Type	Min	Max	Min	Max	Kit Code	Wt. (kg)	Kit Code	Wt. (kg)
Fixed	800	800	1000	1000	DBXHC-5.1X1	3846	DBXHCT-5.1X1	2446
Fixed	950	950	1150	1150	DBXHC-5.1X2	3876	DBXHCT-5.1X2	2476
Telescopic	1200	1500	1400	1700	DBXHC-5.1X3	4270	DBXHCT-5.1X3	2870
Telescopic	1500	2100	1700	2300	DBXHC-5.1X4	4462	DBXHCT-5.1X4	3062
Telescopic	2100	3300	2300	3500	DBXHC-5.1X5	4844	DBXHCT-5.1X5	3444
Telescopic	3000	5100	3200	5300	DBXHC-5.1X6	5434	DBXHCT-5.1X6	4034

7. General Guidance Notes, Off-Loading and Site Handling

7.1. Manpower
The MHSW Regulations require that personnel deployed are suitably trained and experienced and supervised by a competant person. All lifting operations are to be controlled by an appointed person in accordance with BS 7121 and LOLER regulations.

7.2. Plant for Lifting.
A suitable appliance is required for off-loading and assembly. The machine lifting capacity and clearance under the lifting point should be checked against the size and weights of the dragbox to be lifted and assembled.

7.3. Tools and Lifting Chains (available from Mabey Hire Ltd.)
Lifting chains are required of suitable length and capacity complete with current certification. Typically a set of 4 leg 16mm chains with 5.0m leg length complete with shortening clutches and safety hooks. (Code : DBX-SLING/HC Weight : 147kg).
Refer to Lifting Chain User Information for more details.

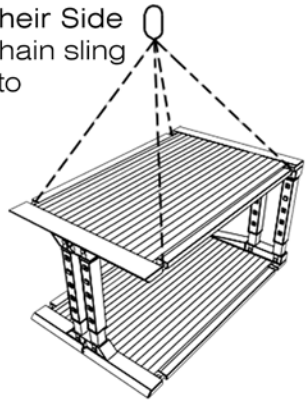
7.4. Edge Protection, Access and Hard Standing Areas
These include :-
- Suitable area to off-load the lorry and assemble the dragbox.
- Suitable hard standing for the machine to operate from to lift the dragbox into the trench.
- Suitable access equipment (ladder or staging) for attaching lifting chains and connecting top extension to base.
- Edge protection, ladders and possibly other provisions to provide safe access into and out of the trench.

(Edge protection and ladder access platform can be supplied by Mabey Hire Services Ltd.).

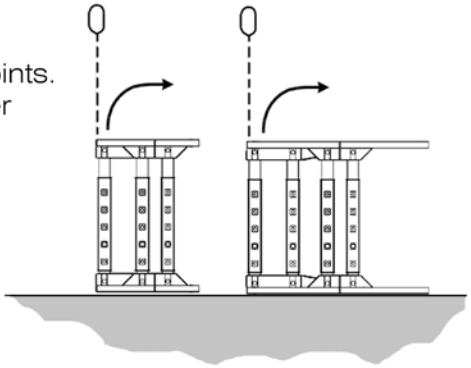
7.5. Supply of Equipment to Site
Mabey Hire will normally supply the drag boxes in 'flat pack' form. Clients will need to allow for site assembly.

7.6. Slinging of the Dragbox (see pages 2 and 4 for weights)

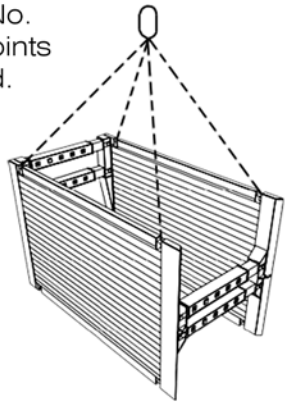
7.6.1 Lifting Assembled Boxes When on Their Side
Use 4 leg chain sling connected to handling points as shown.



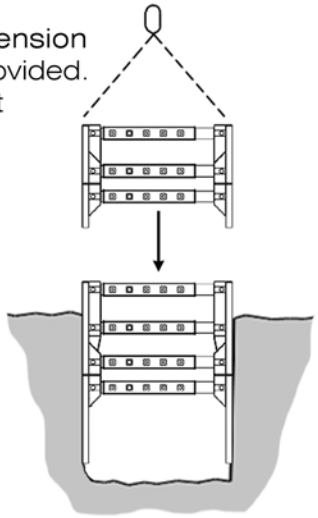
7.6.2 Standing Assembled Boxes Upright
Use 2 No. handling points. Lift by upper panel only.



7.6.3 Lifting Assembled Boxes When in Upright Position.
Use the 4 No. handling points as provided.

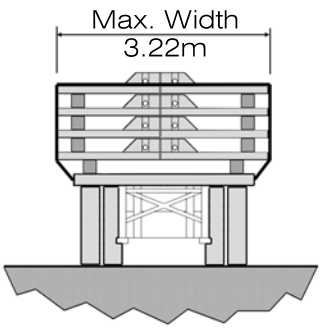


7.6.4 Connection of Top Extension
Use handling points provided. Stand base box upright in partly dug trench. Lower assembled top extension onto base box and fit 4 No. connectors, (DBX-CON/HC) each complete with 2 No. pins (DBX-CONPIN/HC) and 'R' clips.

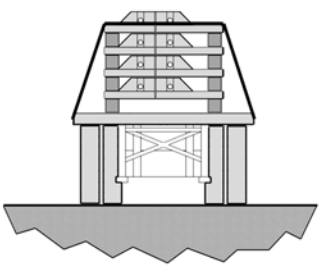


7.7. Return of Equipment Off-Hire
Clients should ensure that on removal, the equipment is returned in sections as supplied.

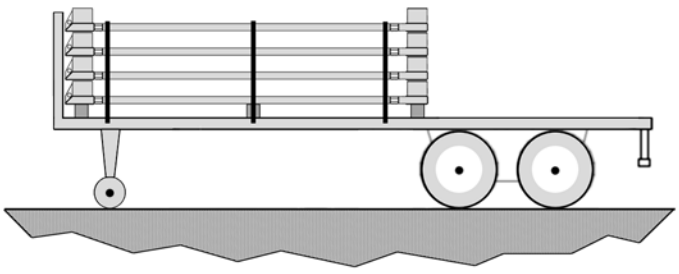
7.8. Stacking and Transportation in Dismantled Form
In dismantled form, panels should be stacked as shown with suitable timber dunnage. (Max. 4 panels per stack).
Ensure panels are stacked directly above one another and all panels in a stack are in the same orientation.
DO NOT stagger or offset the panels within a stack. Long struts should be stored on suitable timber dunnage. Small components should be stored in skips / bins.
During transportation stacks should be securely chained to the lorry. (Min. 3 straps per stack is recommended).



Base Panels
(End View) Max 4 No. per stack with timber packs



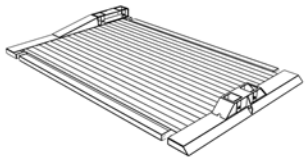
Extension Panels
(End View) Max 4 No. per stack with timber packs



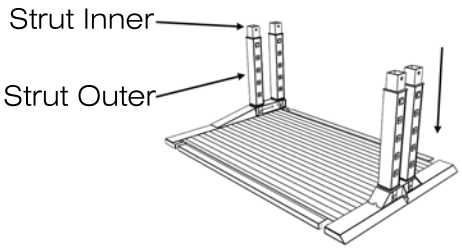
Side View on Loaded Lorry

8. Site Assembly of Base or Extension Boxes (Dismantling is reverse procedure)

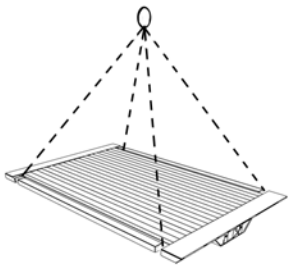
8.1. Lie first panel flat on level ground with the strut connector points upwards. (Max. Weight : 1800 kg)



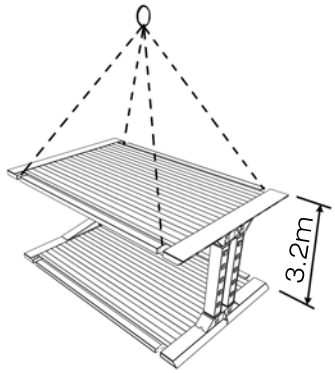
8.2. Lift each of the four struts in turn (with adjustable struts set at their minimum length position) using the 'D' shackles supplied and pin into the panel using 40mm diameter connector pins (DBX-CPIN/HC) plus 'R' clips. NOTE : When using adjustable struts, sling the struts with the strut outer towards the bottom so that the strut inner / outer connector pins are easily accessible.



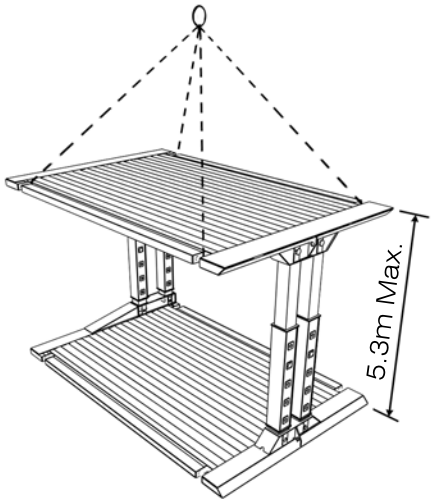
8.3. Lift the second panel with the strut connector points downwards. (Use all four legs of the lifting chain sling)



8.4. Complete assembly of the box on its side by pinning the struts to the upper panel using 40mm diameter connector pins (DBX-CPIN/HC) and 'R' clips. Do not release the weight of the the panel until all of the pins and 'R' clips are in place.



8.5. Adjustable struts should be adjusted to the required width if necessary. Take the weight of the upper panel (use all four legs of the lifting chain) and remove the 50mm diameter strut connector pin (DBX-SPIN/HC) from each strut. Lift the upper panel to the required width and replace all four pins and 'R' clips. Do not release the weight of the panel until all of the pins and 'R' clips are in place.



NOTE : Suitable access equipment (ladder or staging) will be required for assembly of boxes and connection and removal of lifting chains. Refer to section 7.6 for information on safe slinging of the assembled dragbox.

9. Dragbox Use

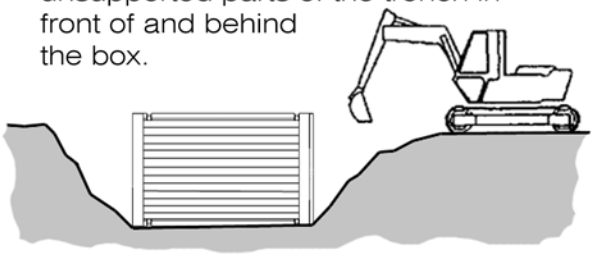
9.1. Preliminaries

- Check all pins complete with 'R' clips are fitted before lifting box into trench.
- A suitable excavator is required - as a guide the manufacturers quoted 'digging force' should be at least five times the weight of the dragbox equipment in use.

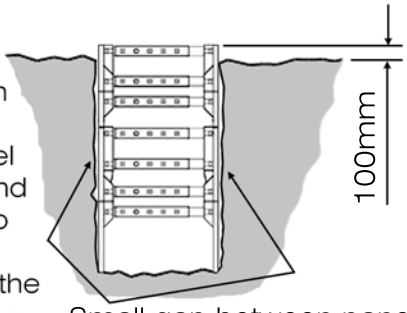
9.2. Installation.

- Excavate initial section of trench. Lift dragbox into trench using excavator or crane.
- The dragbox must NOT be pushed down into the trench.

9.2.1. Always maintain a safe batter of the unsupported parts of the trench in front of and behind the box.

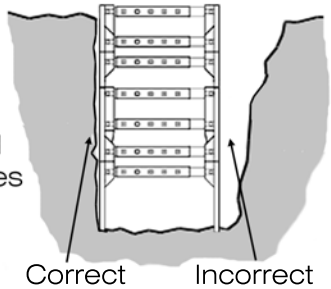


9.2.2. When the required trench width and excavation level are reached and the box sunk to the required depth, ensure the box is vertical.

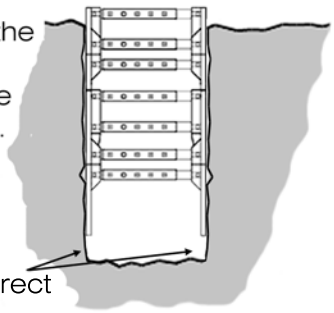


Small gap between panel and excavated face.

9.2.3. Ensure that there are no large voids between the box panel and the trench sides as this may cause the box to move sideways.



9.2.4. DO NOT leave the base of the box 'flying' above the excavation level.



9.3. Entering the Supported Excavation

- Use a ladder to enter the working space between the struts of the Dragbox. Do not climb up or down the struts.
- Do not use any unsupported part of the trench for access.
- Do not move the box when personnel are inside.
- Wear a safety helmet to minimise the risk of head injury.
- Ensure that the excavator operator is aware of your intentions.

9.4. Operation

- Before entering the working space within the Dragbox :-
  - Prepare the pipe bedding material.
  - Lift a section of pipe into the trench.
- Enter the working space and complete installation of the pipe section by joining onto previously laid sections.
- Restrain the pipe section to prevent displacement whilst dragging the Dragbox along the trench.
- Exit from the working space.

Important :

Drag the box forward by hooking the excavator bucket around BOTH front struts of the box.

The pulling force from the excavator bucket must be equally shared between the two front struts otherwise damage may occur. Use the hydraulics of the excavator for this rather than moving the machine on its wheels / tracks.

If the excavated trench walls have partially slumped against the panels, ensure that a suitable chain connected to BOTH pulling points is used to drag the box along the trench.

DO NOT attempt to drag the box using the front struts if there is any side loading on the panels.

- Backfill the trench behind the dragbox.

9.5. Extraction
- Lift from trench with excavator or suitable craneage using 4 leg chain sling (DBX-SLING/HC) connected to the handling points.
- If an extension box is fitted to the base, drag the assembly far enough out of the trench so that the four number connectors and pins can be removed. Lift the extension off the base and then lift the base from the trench.
- Do not lift a base and extension box together.

9.6. Site Storage (Stability Considerations).
- Dragboxes should be stored laid flat on their sides when not in use. Uneven or sloping ground and / or wind loading can result in inadequate stability if left standing upright.

9.7. Trench Reinstatement
- Users should note that some settlement of the reinstated ground and ground adjacent to the Dragbox is likely to occur after backfilling.

9.8. Maintenance
- Ensure all pins complete with 'R' clips are always fitted.
- Damaged struts must not be used.
- We regret we are not able to provide staff to assemble or change boxes from one size to another on site.

If in doubt consult Mabey Hire Limited.

10. Summary - Do's and Don'ts

10.1. Do

- ✓ *Always consult a qualified person if there is any doubt about ground pressures.*
- ✓ Ensure a safe system of work is in place.
- ✓ Ensure all operatives are familiar with the safety and operating instructions (e.g. Toolbox Talk).
- ✓ Take care not to overstress the boxes (watch for bowing of the panels).
- ✓ Drag the box forward by hooking the excavator bucket around BOTH front struts of the box, or using a suitable chain connected to BOTH pulling points.
- ✓ Check all pins and 'R' clips are fitted.
- ✓ Follow the basic maintenance instructions.
- ✓ Use a ladder to enter the box.
- ✓ Wear a safety helmet.
- ✓ Use suitable 4 leg slings and lifting equipment.
- ✓ Provide a landing below the top of the box. This will prevent debris rolling down onto personnel inside the box.
- ✓ Always maintain a safe batter of the unsupported parts of the trench in front of and behind the Dragbox.
- ✓ Store boxes on their side away from the trench.

10.2. Do Not

- × Move the Dragbox with personnel inside.
- × Drag the box using the front struts if there is any side loading on the panels.
- × Hammer the box with the bucket.
- × Use handling points for other than loading / unloading or assembly purposes.
- × Use damaged struts.
- × Lift a base and Extension box together.
- × Use unsafe lifting equipment.
- × Enter unsupported parts of the excavation.
- × Sit astride the box struts.

11. References

CIRIA Report 97 : Trenching Practice.
CPA (STIG) : Safety in Shoring manual.

12. General

Since our policy is one of continual improvement, components may vary in detail from the desciptions given in this publication.